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**RESPONSES TO EPA AND CDH COMMENTS
ON THE
FINAL PHASE II RFI/RI WORKPLAN (ALLUVIAL)
OPERABLE UNIT NO. 2**

2C102

DATED APRIL 12, 1990

ENVIRONMENTAL RESTORATION PROGRAM

**U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO**

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SECTION 1
RESPONSES TO EPA COMMENTS

Responses to EPA

Comments on 903 Pad, Mound, and East Trenches Areas

Final Phase II RFI/RI Workplan

COMMENT

Executive Summary

The bedrock RI/FS workplan for OU 2 will be titled Phase II RFI/RI Workplan (bedrock), not Phase III

Plutonium and americium are also observed in seeps downgradient of the 903 Pad and in the upper reaches of South Walnut Creek. This must be evaluated and discussed within the draft Phase II RFI/RI Report

RESPONSE

The bedrock RI/FS workplan for OU 2 will be titled the Phase II RFI/RI Workplan (bedrock) and is referenced as such in the Phase II Workplan (alluvial)

Reference to the presence of plutonium and americium in seeps downgradient of the pad has been added in the Executive Summary. Their presence can be attributed to the water from the seeps coming in contact with surface soils exhibiting elevated concentrations of these radionuclides. This theory will be evaluated and discussed within the draft Phase II RFI/RI Report.

COMMENT

Section 1.0

The bedrock workplan is also a Phase II Workplan. It is not a Phase III Workplan

RESPONSE

See previous response

COMMENT

Section 1.4.1.1

The location of the burial grounds for the drums containing plutonium contaminated sludge is important to determine as a part of this RFI/RI. 4.54×10^{-3} gm/l plutonium does not correlate to 280 pico Ci/l plutonium

RESPONSE

Available historical references were reviewed in an attempt to determine the location of the burial grounds for the drums containing plutonium contaminated sludge. The information is not provided. The location will be further investigated during the RFI/RI.

4.54×10^{-3} gm/l of plutonium correlates to 280 micro Ci/l, not 280 pico Ci/l. The error has been corrected in the text.

COMMENT

Section 1.4.1.2.

The off-site disposal location of the plutonium contaminated soils removed from the 903 Lip Site must be determined as part of this RFI/RI

RESPONSE

This information is not provided in the available references. The disposal location will be further researched during the RFI/RI.

COMMENT

Section 1.4.1.4.

It is important to know what is meant by destruction of lithium, calcium, magnesium and solvents at site 140 so that the RFI/RI can incorporate this information in characterizing the site. Implementation of the workplan must address this issue.

RESPONSE

The references do not provide any information more descriptive concerning the method of destruction of lithium, calcium, magnesium, and solvents at site 140. It is presumed, however, that the method of destruction for metals was burning (oxidation) of the elemental form. It is possible that additional information will be discovered during preparation of the Historical Release Report.

COMMENT

Section 1.4.2.1.

It is important to ascertain the condition of the drums when the drums were removed from the Mound Site. The RFI/RI must determine if the surficial radionuclide contamination of soil is the result of wind dispersion of contaminants from the 903 Pad Site.

RESPONSE

The condition of the drums when removed from the Mound Site is not provided in the available references. An attempt will be made to acquire this information for the draft Phase II RFI/RI Report.

The hypothesis that surficial radionuclide soil contamination is the result of wind dispersion of contaminants from the 903 Pad Site will be evaluated during the RFI/RI.

COMMENT

Section 1.4.2.2.

It is important to determine the off-site disposal location of the two drums unearthed in 1968 from this site. This information must be presented within the draft Phase II RFI/RI for OU 2.

RESPONSE

The off-site disposal location of the two drums unearthed in 1968 from IHSS No. 108 cannot be determined from the currently available references. Additional research will be conducted in an attempt to gather this information for the RFI/RI.

COMMENT

Section 2.2.2.2.

Implementation of the final workplan must reflect information gathered as a result of the seismic study ongoing

RESPONSE

Results of the seismic study at Rocky Flats will be incorporated into the OU 2 site conceptual model

COMMENT

Section 2.3.1.

Table 2-4 within this section should have been revised to reflect the actual number of samples utilized to calculate tolerance intervals. This information must be updated in the draft Phase II RFI/RI Report for OU 2

RESPONSE

Table 2-4 does reflect the actual number of samples used to calculate tolerance intervals for each geologic material

COMMENT

Section 2.3.2.1

The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the workplan which would allow information derived from the Phase I investigation to be verified or refuted. The Phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final workplan should have referenced the data validation of the Phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

The final Phase II RFI/RI Workplan for OU 2 should have identified that acetone, 2-butanone, chloroform, 4-methyl-2-pentanone, toluene, ethyl benzene, and xylenes appear to be present at Trench T-2. The final workplan should not have excluded the possibility of the presence of methylene chloride, trans-1, 2-dichloroethene, chloroform, trichloroethene, phthalates, and cis-1, 3-dichloropropene from the 903 Pad Area. This information cannot be excluded from the draft Phase II RFI/RI Report.

RESPONSE

The analytical procedures to be used during Phase II are identified in Section 3.2 of the Phase II Workplan. Organic and metal analyses will be performed using CLP routine analytical services, and radionuclide and inorganic analyses will be performed in accordance with the methods specified in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP). Analytical methods with detection limits below or near chemical-specific ARARs will be used to facilitate comparison of resulting data to ARARs.

Validation codes will be presented in the draft Phase II RFI/RI Report.

The presence of acetone (1100 µg/kg), ethyl benzene (780 µg/kg), and total xylenes (3300 µg/kg) in the soils just south of Trench T-2 is acknowledged in the text. Toluene (640 µg/kg) was added to the list of volatile organics detected at Trench T-2 as was a reference to the presence of chloroform and 2-butanone at concentrations estimated below the detection limit. Toluene, chloroform, and 2-butanone

were originally not identified as possible contaminants at Trench T-2 since toluene was detected in only one sample and both chloroform and 2-butanone were estimated at concentrations below the detection limit. The lack of acknowledgement of these compounds in Phase I boreholes at Trench T-2 does not change the proposed workplan. 4-methyl-2-pentanone was not detected in any soil samples from boreholes BH25-87, BH26-87, BH27-87, or BH28-87.

The workplan does not exclude the possibility of the presence of volatile organics at the 903 Pad Area. It does indeed state that, based on soil boring analytical results from Phase I, volatile organics are present in the soil and adjacent to the pad. Additional boreholes drilled during Phase II will verify this conclusion. All soils data will be presented in the draft Phase II RFI/RI Report.

COMMENT

Section 2.3.2.2.

The Oil Burn Pit No. 2 is SWMU No. 153, not SWMU No. 158.

The final Phase II RFI/RI Workplan for OU 2 should have clarified which existing and proposed boreholes will be used to characterize each SWMU, and the numbers and types of soil samples to be collected at each borehole. This information must be included within the draft Phase II RFI/RI Report for OU 2.

Conclusions regarding the presence of plutonium and americium as a result of the wind dispersion of material from the 903 Pad are not acceptable and cannot be substantiated with the present information. The draft RFI/RI Report must substantiate or refute this theory.

RESPONSE

The Oil Burn Pit No. 2 is IHSS No. 153, not IHSS No. 158. The correction has been made in the text.

The boreholes from the Phase I investigation used to characterize each IHSS are presented in Sections 2.3.2.1 (903 Pad Area), 2.3.2.2 (Mound Area), and 2.3.2.3 (East Trenches Area). The proposed boreholes for the Phase II field investigation are discussed in Section 5.2 along with an explanation of the sampling methodology.

The hypothesis that surficial radionuclide soil contamination is the result of wind dispersion of contaminants from the 903 Pad will be evaluated during the RFI/RI.

COMMENT

Section 2.3.2.3.

The draft Phase II RFI/RI Report must be based on use of appropriate analytical procedures. Procedures should have been identified within the workplan which would allow information derived from the Phase I investigation to be verified or refuted. The Phase I investigation seems to have relied upon medium level CLP procedures utilizing inappropriate detection limits for volatile organic compounds. The final workplan should have referenced the data validation of the Phase I data. The draft Phase II RFI/RI Report must reference this information and the RFI/RI work must incorporate and utilize appropriate analytical procedures.

In order to verify that the plutonium and americium contamination of the soil is limited to the surface, the subsurface soils must also be sampled and analyzed for radionuclides (see comment on Section 5.2.3 below).

The final workplan should have indicated that phthalates and 2-butanone were above detection limit within samples from boreholes at trenches T-3, T-4, T-10 and T-11. The final workplan should have indicated that 1,1,1-trichloroethane, toluene, and xylenes appear to be present within boreholes drilled within trenches T-5 through T-9. The draft Phase II RFI/RI Report must reflect this.

RESPONSE

The analytical procedures to be used during Phase II are identified in Section 3.2 of the Phase II Workplan. Organic and metal analyses will be performed using CLP routine analytical services, and radionuclide and inorganic analyses will be performed in accordance with the GRRASP-specified methods. Analytical methods with detection limits below or near chemical-specific ARARs will be used to facilitate comparison of resulting data to ARARs.

Validated codes will be presented in the draft Phase II RFI/RI Report.

The parameter list for the source characterization boreholes is presented in Table 5-5. The radionuclide analytes include gross alpha, gross beta, uranium 233+234, 235, and 238, americium 241, plutonium 239+240, tritium, strontium 90, 89, and cesium 137. A discussion of the sampling protocol is provided in Section 5.2.

The workplan has been revised to acknowledge the presence of di-n-butyl phthalate at concentrations estimated below the detection limits in four samples from boreholes at trenches T-3, T-4, T-10, and T-11. The presence of bis (2-ethylhexyl) phthalate at a maximum concentration of 880 µg/kg in BH45-87 (0-9.5' interval) was also added to this discussion. In addition, the detection of 2-butanone in samples from this area is also acknowledged in the modified text. The detection of toluene, 1,1,1-TCA, and xylenes at concentrations estimated below the detection limit in samples from Trenches T-5 through T-9 has been added to the text. The majority of these compounds were estimated at concentrations below the detection limits and therefore were not identified as potential contaminants in the original plan. The acknowledgement of these compounds in the final workplan does not change the proposed activities.

COMMENT

Section 2.3.3

This section should have clarified how first quarter 1989 site specific well data is compared to second quarter background information. Also, this section should have explained why maximum detected values were utilized instead of upper tolerance limit values, when available. The draft Phase II RFI/RI Report for OU 2 must provide this explanation.

This section should have discussed the designations of the flagged analytical results as they pertain to results estimated above/below detection limits so as to clarify the interpretation of results. The draft Phase II RFI/RI Report must include this explanation. Table 2-9 must be updated in the draft RFI/RI Report to reflect excluded ground water data referenced within EPA comments on the draft Phase II RFI/RI Workplan, Section 2.3.3.1.

RESPONSE

The text has been modified to clarify that all data (with the exception of radionuclide data) discussed in Section 2.3.3 were collected during the second quarter of 1989. However, site-specific radionuclide data relies on first quarter results because complete second quarter site-specific data are unavailable.

Errors were found in Tables 2-10 and 2-11 listing some background values as maximum detected values when they are indeed the upper limit of the tolerance intervals and vice versa. The errors have been corrected and therefore data are only compared to maximum detected values when tolerance intervals are unavailable.

A brief discussion has been added to Section 2.3.3 on data value qualifiers "J" and "E" as reflecting concentrations estimated below and above the detection limit, respectively. This explanation is also presented on the data printouts in the appendices.

The "J" qualifier signifies that the analytical result for a parameter was outside the standard curve range for both the undiluted (high end) and diluted (low end) sample, and therefore, the result is considered

approximate It is important to retain this record of limited accuracy, while still reporting that some contamination may be present.

Table 2-9 was revised and corrected in Revision 1 of the Final Phase II RFI/RIFS Work Plan (alluvial) for OU 2, as appropriate

COMMENT

Section 2.3.3.2.

Why are second quarter 1989 well analytical results compared to maximum detected values instead of calculated tolerance intervals for ground water radionuclide data in Table 2-10? Table 2-11 should have been clarified to note that the background figures presented for comparison to all previously collected data may not represent background for quarters other than the second quarter of 1989. Thus, this serves as a qualitative comparison only. The data presented within Table 2-11 for radionuclides in ground water should be compared to the 1989 second quarter tolerance interval, not the maximum detected level for the second quarter of 1989, even though this tolerance interval is not directly applicable to all data previously collected and is only a qualitative indicator for data collected previous to the second quarter 1989. These explanations must be presented within the draft RFI/RI Report for OU 2

The work implemented to support the draft Phase II RFI/RI for OU 2 must substantiate or refute the evaporative concentration theory and substantiate or refute the transport of contaminants by the south interceptor ditch

RESPONSE

Tables 2-10 and 2-11 have been corrected to reflect upper limits of the tolerance intervals where available. Maximum detected concentrations are only used for comparison where tolerance intervals are unavailable.

A statement has been added to Section 2.3.3.2 to explain that the background figures presented for comparison in Tables 2-10 and 2-11 are for qualitative comparison, and may not represent background for other quarters in 1989.

The conceptual model that local concentrations of certain contaminants are due to evaporation of shallow ground water will be further investigated during the Phase II activities, and the results will be presented in the draft Phase II RFI/RI report. This investigation will determine the role of the South Interceptor Ditch in attributing to the elevated major ion concentrations in well 29-87.

COMMENT

Section 2.3.5.2.

Data and sampling locations for samples taken in October, 1989 must be presented within the draft Phase II RFI/RI Report for OU 2

RESPONSE

The analytical results for the samples collected in October 1989 will be presented in the draft Phase II RFI/RI Report.

COMMENT

Section 2.4

This section should have been titled Chemical Specific Applicable or Relevant and Appropriate Requirements. The following comments on the ARAR analysis are intended, in part, to conform the ARAR analysis to specific requirements of the revised NCP and will require the reformulation of Table 2-12, potential chemical specific ARAR concentrations when presented within the draft Phase II RFI/RI Report for OU 2

- *The ARAR screening process should not be performed serially. Rather, relevant and appropriate requirements are considered in the same manner as applicable requirements. When more than one ARAR is identified, the most stringent ARAR is to be used.*
- *Pursuant to the NCP [40 CFR 300.430 (e)(2)(i)(B)], MCLGs must be attained for remedial actions for ground or surface waters that are current or potential sources of drinking water. Where the MCLG is set at level of zero, the MCL must be attained.*
- *Pursuant to the NCP (40 CFR 300.430 (e)(2)(i)(E)), Water Quality Criteria must be attained where relevant and appropriate.*
- *Pursuant to the NCP (40 CFR 300.430 (e)(2)(i)(A)(2)), the 10E-6 risk level is to be used for carcinogens which do not have an ARAR. In particular, this should be evaluated for strontium. In addition, in evaluating the potential alternatives, all ARARs taken together should not present a cumulative risk in excess of 10E-4. If such risk would be exceeded for a particular alternative, the ARARs may need to be scaled back accordingly (see also 40 CFR 300.430 (e)(2)(i)(D)).*
- *RCRA LDR is an action specific ARAR, triggered by the placement of a restricted waste. For the purposes of identifying chemical specific ARARs prior to screening remedies, the RCRA LDR standards in Subpart D or 40 CFR part 268 should be classified as "items to be considered".*

The newly promulgated applicable CDH surface water standard for trihalomethanes is 190 ppb. The newly promulgated applicable CDH surface water standard for 1, 1, 2, 2-tetrachloroethane is 170 parts per trillion. Although contaminant concentrations in ground water were estimated below detection limits, ARARs analyses must be presented for methylene chloride, acetone, carbon disulfide, 1, 2-dichloroethene and toluene. Potential ARARs for phthalates and PCBs must also be presented. This information must be revised within the draft RFI/RI Report for OU 2.

RESPONSE

Section 2.4 and Table 2-13 (formerly Table 2-12) have been revised to incorporate the following NCP [FR Vol 55, No. 46, 8848, 40 CFR 300.430 (e)] considerations in development of remedial alternatives:

- 1 Potential ARARs,
- 2 for systematic contaminants, concentration levels that will not cause adverse effects to the human population and sensitive subgroups over a lifetime of exposure,
- 3 for carcinogens, concentration levels that represent an excess lifetime individual cancer risk less than 10^{-4} considering multiple contaminants and multiple pathways of exposure,
- 4 factors related to detection limits,
- 5 attainment of MCLGs (or MCLs if MCLGs are zero) if water is a current or potential source of drinking water; and,
- 6 attainment of Clean Water Act (CWA) water quality criteria where relevant and appropriate.

It is further noted in Table 2-13 that the RCRA LDRs are action-specific ARARs for placement of restricted waste, the CDH surface water trihalomethane standard is 190 ppb, and ARARs (or TBCs) are shown for all volatiles detected in ground water or surface water (1,1,2,2-tetrachloroethane was not detected and has been removed from the table) Phthalates and PCBs have only been detected in soils Chemical-specific ARARs for organic contaminants in soils do not exist and must be determined through a risk assessment

COMMENT

Section 3.1.

Concerning the Table 3-1 objective of characterizing the nature and extent of contamination, DOE must also include evaluation of the horizontal and vertical extent of inorganic and organic contamination in soils external to SWMUs. This addition must be carried forward through Sections 4.0 and 5.0 of the workplan and must be implemented and the resulting information presented within the draft Phase II RFI/RI Report for OU 2. The characterization of sources must be completed regardless of the past removal of wastes from some of the sites. This information must be provided within the draft Phase II RFI/RI Report for OU 2.

RESPONSE

Contamination beyond IHSS boundaries would have occurred through migration primarily by ground-water transport and wind dispersion (e.g., plutonium). Accordingly, contamination beyond the IHSS boundaries is being investigated by use of monitoring wells for determination of ground-water quality and soil profiles for plutonium contamination.

COMMENT

Section 3.2

Table 3-2 must be modified to reflect the new NCP modification of the ARARs analysis presented in Section 2.4 and the update of the CDH standards for trihalomethanes and 1, 1, 2, 2-tetrachloroethane as indicated in comments pertaining to Section 2.4 above.

The final workplan should have identified workplan items designed to provide information not present in the Phase I RI. These shortcomings must be identified, corrected and presented within the draft Phase II RFI/RI Report for OU 2.

RESPONSE

Table 3-2 has been removed because it provided redundant information relative to Table 2-13.

Section 3.1 summarizes the conclusions of the previous investigations conducted at OU 2. Along with the general conclusions, this section identifies issues that were not resolved during these investigations. For example, further characterization of potential contaminant sources is needed, the nature and extent of contamination has not been fully determined, and additional characterization of the unconfined ground-water flow system is necessary.

Table 3-1 cites the objectives of the Phase II RFI/RI work plan. These objectives and the associated proposed planned activities target the shortcomings identified in Section 3.1.

COMMENT

Section 4.1.3

The brief description of the activities required for the remedial investigation do not correlate to the objectives presented within Section 3.2 of the workplan. For example, not just the surface soils will be sampled and analyzed for radionuclide contamination.

RESPONSE

Revisions have been made to Section 4.1.3 of the workplan to ensure that the activities required for the remedial investigation correlate to the objectives of the Phase II RFI/RI.

COMMENT

Section 4.1.6

For clarity, this section should have further stated that the risk assessment will assume no institutional controls. The risk assessment to be presented within the draft Phase II RFI/RI Report for OU 2 must reflect this requirement.

RESPONSE

The text has been modified to state that the risk assessment will assume no institutional controls.

COMMENT

Section 4.1.6.2.

This section describes work which may be required to evaluate environmental impact associated with the disposal practices at OU 2. Data needs and actual workplan objectives are not described or defined within Section 3.0 of the workplan. The draft RFI/RI must present this information and a detailed description of the methods utilized to realize these data needs.

RESPONSE

Table 3-1 in Section 3.2 has been revised to provide objectives and data needs for assessing environmental impacts related to disposal practices at OU 2. The Environmental Evaluation Workplan for OU2 is presented in Section 6 of this Workplan.

COMMENT

Section 4.2.2.1.

The compliance with ARARs section should have been reworded to state "The analysis will address compliance with chemical specific, location specific and action specific ARARs in accordance with the NCP. If an alternative will not comply with an ARAR, the FS report will propose a basis for justifying a waiver, if appropriate." The draft Phase II RFI/RI Report must be prepared to reflect this change.

RESPONSE

The text has been modified as directed in this comment.

COMMENT

Section 4.2.3.

The progression of Feasibility Study documents is draft to final Under the proposed IAG, there is no provision for the Feasibility Study to go to public comment The Proposed Plan goes to public comment

RESPONSE

The discussion in Section 4.2.3 describing the progression of the Feasibility Study Report has been modified to explain that the final FS will incorporate EPA and CDH comments No reference to public comments are made

COMMENT

Section 5.0.

DOE must present rationale for not analyzing both filtered and unfiltered samples for metal constituents.

RESPONSE

In general, wells at OU 2 do not yield sufficient quantities of water to perform both filtered and unfiltered analysis Dissolved metals analysis provides the best representation of the metals within ground water capable of migrating in this medium Total metals analysis would reflect dissolved metals and those leached from sediments within the well and is less amenable to interpretation

COMMENT

Section 5.1.1.

It is unclear how Table 5-1 correlates with statements made in this section concerning well screened interval The well screened interval tables should have followed the procedures outlined within this section

An alluvial monitoring well must be located approximately 150 feet south southeast of newly proposed well 85-90 New well 35-90 must be relocated approximately 50 feet west of proposed location

RESPONSE

Table 5-1 presents the anticipated screened interval for each proposed monitoring well based on historical water level information. The table and associated text now state that if the saturated thickness at a location is greater than ten feet, multiple wells will be installed It is not prudent at this time to base well numbers on estimated saturated thicknesses

An alluvial well (105-90) has been added approximately 150 feet south southeast of the proposed well 85-90 to investigate ground-water quality downgradient of the 903 Pad Area. Well 35-90 has been relocated approximately 50 feet west of the original proposed location to provide a better location for defining the plume north of Trench T-3

COMMENT

Section 5.1.1.3.

DOE must not reduce the parameter list for analysis of ground water samples prior to receiving approval from the regulatory agencies.

RESPONSE

DOE will consult with EPA and CDH prior to reducing the analyte list

COMMENT

Section 5.2.1.2.

Boreholes must be located immediately downgradient of sites 153 and 154. These boreholes must be located as close to the source sites as is allowed. Boreholes must be located on both sides of site 108 in addition to the proposed monitoring wells. The draft RFI/RI Report for OU 2 must include this requirement. A borehole must be placed to characterize the potential for a source to be located within site 183.

RESPONSE

As discussed in Section 5.2.1.2, the western area of the Pallet Burn Site is inaccessible and therefore additional borings are not proposed. An additional borehole (BH2890) will be drilled in the eastern area to aid in verifying the IHSS location.

Additional boreholes suggested by EPA for site 108 will not be drilled due to the presence of the barrels throughout the site. As explained in response to EPA comment on Section 3.1, contamination beyond IHSS boundaries will be investigated through the use of monitoring wells and soil profile samples. Boreholes will only be drilled for source characterization.

A monitor well and borehole (106-90/BH4690) have been added to characterize the potential source within the gas detoxification site and to investigate ground-water quality beneath the site.

COMMENT

Section 5.2.1.3.

Boreholes must be placed external to, and downgradient from sites within the East Trenches Areas. This is necessary in order to verify the results of the Phase I investigation. These boreholes must be sampled for all constituents listed within Table 5-5. If Trench T-10 is filled with barrels, boreholes must be drilled adjacent to this site and Figure 1-5 should have been modified to reflect this information. Boreholes and wells must be completed and sampled in surface water drainages downgradient of the east spray fields to evaluate the effect they have had on these drainages. The draft phase II RFI/RI Report must include information derived from inclusion of these boreholes.

RESPONSE

Boreholes are drilled to investigate potential source areas. Boreholes will not be drilled outside of IHSS boundaries since contaminant migration via ground water will be investigated by installing and sampling monitor wells. As described in Section 5.1.1.1 alluvial monitor wells 38-90 and 39-90 will be installed between Trenches T-3/T-4 and T-11/T-10 in an attempt to differentiate the two groups of trenches as contaminant sources. Wells 40-90 and 41-91 will be located southeast of Trench T-10 to further characterize the extent of volatile organics in alluvial ground water.

COMMENT

Section 5.2.3.

Given that stored and buried drums contained plutonium and uranium, the soils must be sampled for plutonium 239 and 240, americium 241 and uranium 233/234, 235 and 238. Also, if the one meter depth proposed for the vertical profile indicates that radionuclides are found at depth, further characterization may be warranted. It would be prudent to sample small discrete intervals within proposed boreholes drilled into and adjacent to sites known to have contained radionuclides to verify the premise that 903 Pad is responsible for the radionuclides present in the soils affected by OU 2. This is necessary as some borehole samples taken at depth do indicate the presence of plutonium and americium.

RESPONSE

Table 5-5 lists the source sampling parameters for the borehole soils. The radionuclides include gross alpha, gross beta, uranium 233+234, 235, and 238, americium 241, plutonium 239, 240, tritium, strontium 90, 89, and cesium 137. Boreholes to be drilled into IHSSs will extend from the ground surface to the base of weathered bedrock. Continuous samples will be collected for geologic descriptions for the entire borehole depth. From this core, discrete samples will be submitted for laboratory chemical analysis at the water table. In addition, a discrete sample will be collected for chemical analysis at the water table. Core from saturated surficial materials will not be submitted to the laboratory, as the presence of water in this zone will affect interpretation of chemical results. In order to prevent alluvial ground water from affecting weathered bedrock samples, surface casing will be grouted into the borehole through surficial materials. Subsequent to grout hardening, the borehole will then be advanced through weathered bedrock with continuous sampling. Discrete samples from the core will be submitted to the laboratory for chemical analysis from two feet immediately below the casing, and every four feet thereafter to the base of weathering. With regard to the plutonium/americium profiles at the surface, a one meter depth sample is almost assuredly not going to show elevated plutonium/americium unless the sampling location is at, or adjacent to, an IHSS where these radionuclides were disposed and have been released to the environment. In this case, the boreholes will provide the needed data for greater depths.

Responses to EPA Comments
Comments on 903 Pad, Mound, and East Trenches Areas
Final Phase II RFI/RI Workplan
OU 2 Toxicity

GENERAL COMMENTS

COMMENT

In general, the draft workplan for the baseline risk assessment conforms to EPA guidance for risk assessments. However, you should be aware that the region is now in the process of developing a "generic" workplan for risk assessments. Once completed, EPA will forward this information to you. This workplan will, in general, conform to plans now in existence and those under development in other regional offices. Included in the workplan will be a set of regionally specific exposure parameters to be used in the exposure assessment portion of the baseline risk assessment. Deviation from these exposure parameters will require adequate documentation, and the approval of EPA.

RESPONSE

Region-specific exposure parameters determined by EPA will be used where available. Any proposed deviation from the parameters will be documented and submitted to the EPA for approval prior to preparation of the risk assessment.

SPECIFIC COMMENTS

Page 4-6, Paragraph 3, Objectives

COMMENT

Objective 2 includes fate and transport analysis within environmental media. It is also essential that the baseline risk assessment address cross media fate and transport. For instance, such analysis must include contamination of ground water from soil sources, contamination of air from soils or water, etc.

RESPONSE

Cross-media fate and transport will be considered.

Page 4-7, Paragraph 1, Documents to be used

COMMENT

In addition to the documents listed in Table 4-1, EPA will be using documents included on the attached list for development and review of the baseline risk assessment.

RESPONSE

Table 4-1 of the work plan has been revised to include the documents EPA listed for use in risk assessment preparation and evaluation.

RESPONSES TO EPA COMMENTS

OU 2 TOXICITY (continued)

Page 4-9. Paragraph 1. Contaminants to be considered

COMMENT

The following criteria must be used in identifying chemicals to be addressed in the baseline risk assessment

- a) *Those chemicals positively detected in at least one CLP sample (RAS or SAS) in a given medium, including chemicals with qualifiers attached indicating known identities, but unknown concentrations*
- b) *Chemicals detected at levels elevated above background*
- c) *Chemicals which have been tentatively identified and may be associated with the site based on historical information, or have been confirmed by SAS*
- d) *Transformation products of site associated chemicals*

It is unclear what is meant in the draft workplan by "risk based detection limits" Analytical detection limits based upon the best available technology must be used

Chemicals must not be eliminated based upon environmental fate predictions until the exposure assessment phase of the baseline risk assessment is completed

RESPONSE

Criteria a, b, and c as listed in the comment above will be used in selecting site contaminants. It is not clear what level of detail is expected in the evaluation of potential transformation products. The prediction of the transformation products is dependent on the availability of transformation information in the scientific literature and on information regarding chemical, physical, and microbial site conditions. Quantitative estimates of transformation products would also be complicated, and depend on site-specific conditions as well as information regarding the approach to evaluating transformation products.

Analytical detection limits will be based upon the best available technology

Chemicals will not be eliminated based on fate predictions until the exposure assessment is completed

Page 4-10. Bullet 2. Exposure scenarios

COMMENT

Scenario selection should proceed regardless of the ability to quantify exposure. This may require exposure to be addressed qualitatively under circumstances where quantitative evaluation is not possible

RESPONSE

All plausible exposure scenarios will be identified, regardless of the ability to quantify exposure

RESPONSES TO EPA COMMENTS

OU 2 TOXICITY (continued)

Page 4-10. Paragraph 2. Factors examined in pathway identification

COMMENT

In addition to the factors listed, detailed local meteorological data must be considered

It may be advantageous to consider receptor characteristics rather than "exposure scenarios" for the purpose of the baseline risk assessment. Each of the scenarios listed include several of the same receptor subpopulations. To avoid a duplication of effort, it may be more efficient to directly assess exposure and potential toxicity to subpopulations.

RESPONSE

Detailed local meteorological data must be considered

To avoid duplication, the scenarios will be based on discrete subpopulations (e.g., residents and workers)

Page 4-11. Paragraph 1. Cancer risk

COMMENT

It is not clear what is meant by the statement "Doses or the dose might result in an excess cancer risk for noncarcinogenic health". Please explain

RESPONSE

The statement "doses or the dose might result in an excess cancer risk for noncarcinogenic health" has been rewritten to state, "doses might exceed risk reference doses (RfDs) and or might result in an excess cancer risk greater than the acceptable target risk as defined by EPA (i.e., to 10^{-6} to 10^{-4})"

Page 4-11. Paragraph 2. Critical toxicity values

COMMENT

Reference values for systemic or carcinogenic risk derived from SPHEM or PHRED will not be acceptable for use in the baseline risk assessments. Both of the above sources are now obsolete and have been replaced

RESPONSE

Toxicity reference values from EPA's Integrated Risk Information System (IRIS) will be used in preference to other EPA reference values.

RESPONSES TO EPA COMMENTS

OU 2 TOXICITY (continued)

Page 4-12. Paragraph 2. Types of toxicity values

COMMENT

It will be unnecessary to generate toxicity values for subchronic exposure. Chronic exposure will provide a more conservative assessment and will drive the rationale for any cleanup activity which may be indicated.

The preferred terminology for acceptable intake for chronic exposure (AIC) is now "risk reference dose" (RFD). To avoid confusion, this terminology should be used throughout the baseline risk assessment and the AIC terminology should be discontinued.

RESPONSE

Toxicity values will be generated for chronic exposure only.

The term (risk) reference dose (RFD) will be used in the risk assessment to describe the toxicity value for acceptable chronic daily intake.

Page 4-12. Paragraph 3. Risk characterization

COMMENT

The reasonable maximum estimate of exposure (RME), based upon the 95% upper confidence limit of the exposure data, must be used throughout the baseline risk assessment process. Details must be provided regarding the rationale and methodology for development of subchronic exposure estimates.

RESPONSE

The upper 95 percent confidence limit of the exposure data will be used to calculate the exposure concentrations. Based on the previous comment that there is no need to generate toxicity values, it is assumed that there will also be no need to develop subchronic exposure estimates.

Page 4-12. Paragraph 2. Aquatic toxicity

COMMENT

Where applicable, assessment of sediment toxicity must be included in the environmental portion of the risk assessment.

RESPONSE

An assessment of sediment toxicity will be included in the environmental evaluation if applicable.

SECTION 2
RESPONSES TO CDH COMMENTS

CDH Comments On The Rocky Flats Plant

Final Phase II RFI/RIFS Workplan

COMMENT

General Comments

This and other similar documents submitted for review by DOE do an excellent job of covering geology, demographics, physical location, ecology, and both underground and surface water, but they all lack good coverage of meteorological and fugitive emissions information. In this document wind dispersion is referred to once in Section 1.4.2.1 Mound Site (SWMU Ref No 113) but with little explanation. Particulates are a major method of transport for contaminants through reentrainment. Any leakage or spills of solids such as those from deteriorating pondcrete and construction activities of other soil disturbances will also add to fugitive particulates in the air which are a pollutant by themselves and may also carry other contaminants.

A second area of fugitive emissions which did not receive adequate consideration are fugitive VOC emissions. These may occur from drum leakage, spills, seeps, etc. While these emissions may be of minor levels they add to the total plant emissions and are never controlled. Both the VOC and particulate emissions can have impacts on both human health and the environment.

RESPONSE

Extensive meteorologic and air monitoring data exist for the Rocky Flats Plant. These data are reported in monthly and annual monitoring reports produced by Rockwell International and now EG&G. In addition, total long lived alpha and VOC fugitive emissions were monitored during the Phase I RI. A discussion of this monitoring program was added to Section 2.3.6 of the work plan. Monitoring of radioactive and VOC fugitive emissions will also be needed at OU 2 during Phase II RFI/RI field activities. The Health and Safety Plan currently being prepared for OU 2 will include plans for this monitoring.

COMMENT

Section 1.0

Figure 1-5

The location of the 903 Area "Lip" is inconsistent with the historical definition of the "Lip", particularly with regard to what was removed and the material shipped to NTS as low level radiological waste. The historical "Lip" is SE of the 903 Pad, over the brow of the hill (a depositional area of windblown contamination). The narrative does mention the removal in relation to the metals destruction area that occurred there also. Considerable covering and recontouring of the 903 Area has occurred which with complicate cleanup/removal.

RESPONSE

The 903 Pad "Lip" Area illustrated in Figure 1-5 is consistent with the area portrayed on the original SWMU map found in the Comprehensive Environmental Assessment and Response Program Phase I document.

COMMENT

Section 1.3.1.2.

Previous investigations, item 8 makes minor reference to meteorological studies but does not detail This should have included a study of fugitive particulates

RESPONSE

The annual environmental monitoring reports produced by Rockwell International and now EG&G cover ambient air quality monitoring for radioactive particulates (See Section 2.3.6) There are several meteorological studies which could be listed as part of this section if additional meteorological information is required. Some deal with contaminant transport and resuspension of particulates (Langer, G "Fugitive Dust Measurements and Modeling", Langer G, 1989, "Resuspension of Rocky Flats Soil Particles Containing Plutonium")

The routine monitoring that has been done for Total Suspended Particulate (TSP) is included in both the monthly and annual Environmental Reports for Rocky Flats. Data are available for TSP since 1981 at one location near the east entrance to the Plant.

COMMENT

Section 1.4.1.1 Page 1-19

There is no reference to HASL-235 information which indicated that the loss of control of materials was greater than 86 grams. It may be that other documents referenced do include discussion of HASL-235 et seq documentation. Also recognize that statements made about inventory lost from control are time related, in that the plant boundary has changed over the years

RESPONSE

Need HASL - 235

COMMENT

Section 1.4.1.2 Page 1-23

The off-site disposal location of the first two soil cleanups is unknown Is the off-site disposal location of the 214 tri-wall pallets of contaminated soil removed during the 1984 third soil clean up unknown as well?

RESPONSE

The available references do not provide any information concerning the off-site disposal location of contaminated soil from the 1984 third soil cleanup

COMMENT

Section 1.4.2.2 Page 1-26

Ground penetrating radar or some other kind of noninvasive geophysical investigation should be done to define the location of the 125 buried drums in Trench T-1, SWMU Ref No 108

RESPONSE

A magnetometer survey was conducted, and the drum locations as determined by this investigation and by visual inspection are shown in Figure 1-5

COMMENT

Section 1.4.3.1 Page 1-27

Again, some kind of noninvasive geophysical investigation should be done to define the location of the 300 buried drums

RESPONSE

Figure 1-5 exhibits the location of the barrels as determined by visual inspection and/or magnetometer survey

COMMENT

Section 2.0

Phase I Site Evaluation item nine, air monitoring for total long lived, alpha, plutonium, and volatile organics during field activities is listed, however, the collection and analytical methods should also be referenced for evaluation

RESPONSE

A discussion has been added to Section 2.3.6 describing the field air monitoring conducted during the Phase I site evaluation including the sampling protocols and results.

COMMENT

Table 2-3

Regarding radiological parameters, the results for sediments should be in pCi/gram, not pCi/liter

RESPONSE

Table 2-3 has been corrected to show pCi/gram as the unit for sediment radiological parameter results.

COMMENT

Table 2-4

Are the radiological parameter results to be in pCi/l or pCi/gram?

RESPONSE

Table 2-4 has also been corrected to show pCi/gram as the unit for radiological parameter results.

COMMENT

Section 2.3.1 Page 2-14

It is not an acceptable practice to use background concentrations derived from maximum detectable values i.e. sample size less than seven and in some cases as few as two samples, to identify contaminated sites. It is acceptable to use maximum background values for borehole and monitoring well placement. All background concentrations used to identify contaminated sites must be within 95% upper tolerance interval limits, or 95% or higher upper confidence interval limits.

RESPONSE

Maximum detected background values are used for comparison with site-specific data when tolerance intervals are not available. The text in Section 2.3.1 has been modified to state that tolerance intervals will be used to assess the presence of contamination, whereas site-specific chemical concentrations above the maximum detected background values will be considered a preliminary indication of possible contamination.

COMMENT

Section 2.3.2.1 Page 2-28

No reference to HASL-235 et seq documentation. There is no mention of the work done by Michels (RI) who did work on the depth of soil contamination penetration in the 903 Area. Michels also published information regarding background Pu in the midwest for comparison with the RFP environs.

RESPONSE

Need HASL - 235

COMMENT

Section 2.3.2.1 Page 2-31

The reduction of Pu/Am contamination by wet screening is suspect. While Pu attaches to clay particles and particle size separation (a soils classification methodology used by USGS and Dr. Johnson) is feasible, there are complications. The wet process takes considerable water and total destruction of the particle conglomerates. The treatment and disposal of such waste water would present additional complications. Dry separation is also problematic due to the dust generated even with closed systems. Cleveland (RI now USGS) tried the process using clean soil unsuccessfully at the Sweeny Mining and Milling facility on Sugarloaf above Boulder.

RESPONSE

The reference in Section 2.3.2.1 to the use of wet screening for the reduction of plutonium and americium soil contamination below the 903 Pad is cited as a conclusion drawn from a study conducted by Navratil (1979). Wet and dry separation methods will be thoroughly evaluated during the CMS/FS

COMMENT

Section 2.3.2.2 Page 2-37

The 903 Drum Storage area has been identified as the wind dispersal source of ground surface plutonium and americium contamination at the Mound, Oil Burn Pit and Trench Sites. There should be a meteorological analysis of the direction of prevailing winds over the site with respect to

topography Were there topographical features where winds could have deposited significant amounts of radionuclide contaminated soil before the pad was placed on 903?

How many additional soil samples will be collected from borings at both possible Pallet Burn Sites? Will the soil sampling tests and data needed to evaluate depth and extent of plutonium in soils at both Pallet Burn sites be completed and presented in the Draft phase RI Plan?

RESPONSE

A meteorological analysis along with the plutonium/amerium profile data (see Section 5.1.3) will be used in substantiating or refuting the theory that the 903 drum storage area is the source of surficial soil plutonium and amerium contamination. The results of the investigation will be presented in the draft Phase II RFI/RI Report.

The proposed boreholes for the Phase II field investigation are discussed in Section 5.2 of the work plan along with an explanation of the sampling methodology. As discussed in Section 5.2.1.2, the western possible location for the Pallet Burn Site is inaccessible, and therefore, additional borings are not proposed. An additional borehole (BH 2890) will be drilled in the possible eastern location to aid in evaluating the site boundary. All soil analytical results will be provided in the draft Phase II RFI/RI Report.

COMMENT

Section 2.3.2 Soils

What radionuclides, other than amerium and plutonium will be tested for in evaluation of elevated Pu and Am concentration in surface soils?

RESPONSE

The statement referenced in this comment has been clarified to state that amerium and plutonium will be sampled in surficial soils. The Phase I investigations and Rockwell data indicate that there is elevated plutonium and amerium in the surficial soils. Therefore, surficial soil samples (5 cm deep and 1/8" deep) and vertical profile samples (1 meter deep) will be analyzed for plutonium 239+240 and amerium 241. Boreholes drilled to characterize IHSSs will be sampled for the full suite of radionuclides presented in Table 5-5.

COMMENT

Section 2.3.2.1

903 Pad & Lip Sites Ph I RI Soil Investigation Results. How many and where, will the additional boreholes, through and immediately adjacent to the pad during Phase II RI validation of VOC soil contamination be placed?

Page 2-35 Specify what additional surficial soil and soil profiling is going to characterize the radionuclide distribution on the 903 Pad and Lip Sites.

RESPONSE

The proposed boreholes for further investigation of the 903 Pad area are presented in Section 5.2.1.1. Thirteen borings are proposed within and adjacent to the pad to characterize the vertical and horizontal extent of radionuclide and solvent contamination.

Section 5.1.3 provides a discussion of the surficial soil sampling and profile sampling program to be conducted for the Phase II investigation. Soil samples for plutonium 239+240, and amerium 241 will be collected from 57 10-acre plots. Also, vertical profiles to a depth of one meter for plutonium and

americium will be collected. The sampling locations are near the 903 Pad, Mound, and East Trenches Areas and in the buffer zone to Indiana Street.

COMMENT

Section 2.3.2.3 Page 2-38

Page 2-39 What was the depth of the uppermost soil sample taken at Borehole BH 52-87, where the most contaminated soil was found?

RESPONSE

The uppermost soil sample taken at Borehole BH52-87 composited from 0 to 9.5 feet below ground surface.

COMMENT

Section 2.3.3.1 Page 2-42

Will the CCl₄ plume at 903 Pad be sufficiently delineated by information gained from the additional boreholes placed immediately adjacent to the pad, referred to in Section 2.3.2.1 for VOC soil contamination Ph II RI Validation?

Page 2-48 How many and where will the additional monitoring wells to delineate the extent of PCE contamination, (southeast downgradient of the 903 Pad and Trench T-2), be placed?

Page 2-49 How will the additional data required to assess the significance of chloroform in wells 28-87 and 30-87 be gathered?

Page 2-50 What further sampling and analysis will be done to resolve methylene chloride and acetone contamination at well 36-87BR?

RESPONSE

Eighteen new alluvial monitoring wells are proposed to further define the extent of volatile organics in the shallow ground-water system east and southeast of the 903 Pad Area. Thirteen boreholes are proposed within and immediately adjacent to the 903 Pad to characterize the vertical and horizontal extent of both solvent and radionuclide contamination beneath the pad. Samples from the proposed monitoring wells and boreholes for the Phase II investigation should provide sufficient information to delineate the carbon tetrachloride plume in the 903 Pad Area as well as determining the extent of solvent contamination in the soils beneath the pad.

Section 5.1.1.1 provides a discussion of the number and location of proposed alluvial monitoring wells for the 903 Pad Area. A total of eighteen new wells will be installed during Phase II to aid in defining the extent of volatile organic in ground water in the 903 Pad Area.

In order to assess the significance of the isolated reports of chloroform in wells 28-87 and 30-87, additional monitoring of these wells will be conducted and additional monitoring wells will be installed in unweathered sandstones in the area. This work will be conducted during the Phase II bedrock investigation as outlined in the Phase II RFI/RI Work Plan (bedrock).

Well 36-87 will continue to be sampled during the quarterly sampling program. The additional methylene chloride and acetone data will provide the necessary information to determine if the previous reports of these analytes in well 36-87 represent actual contamination or are laboratory artifact.

COMMENT

Section 2.3.6 Page 2-81

The ambient air data is not provided by individual station, which is important, as the individual station data of significance is washed out in averaging. The resultant summary talks in generalities only. There is a need to require historical air sampling data as current concentrations are lower, due to surficial burial of the contamination.

RESPONSE

All data collected as part of the Radioactive Ambient Air Monitoring Program (RAAMP) are reported monthly by individual site. These data are available in the Rocky Flats Plant Monthly Environmental Monitoring Reports.

COMMENT

Page 2-84

The last sentence refers to airborne plutonium contamination as being in compliance with Clean Air Act regulations (40 CFR 61). Subpart H of 40 CFR 61 is the National Emission Standard for Radionuclide Emissions from Department of Energy (DOE) facilities. This covers radionuclide emissions as a whole and not specifically for plutonium as implied in the document. There are no specific standards for plutonium in the CFR or State Regulations.

RESPONSE

The text has been modified to remove the implication that there are specific standards for plutonium in the CFR or state regulations.

COMMENT

Section 2.3.8 Page 2-85

The summary of contamination only addresses ground water. There are no statements regarding soil contamination.

RESPONSE

This section has been modified to cite the principal contaminants in each environmental media.

COMMENT

Section 2.4

Applicable or Relevant and Appropriate Requirements should also include a reference to the Colorado Clean Air Act and the Air Quality Control Commission's (AQCC) Regulations. The AQCC regulations are especially important for considerations of complete or partial removal and treatment of wastes and contaminated soils, which are again referred to in Section 2.5. The regulations also apply for in-situ treatment.

RESPONSE

The AQCC regulations are important to consider in evaluating treatment alternatives with air emissions. These action-specific ARARs will be fully addressed in the CMS/FS report. The text of Section 2.4 has been revised to state that the purpose of the section is to identify chemical-specific ARARs so that appropriate analytical detection limits are used during the RFI/RI to evaluate compliance with these ARARs.

COMMENT

Section 2.4 Page 2-87 to 2-95 Table 2-12

Table 2-12 and Section 2.4 on ARARs addresses water only. No mention of ARARs for soil and sediment contamination for radiological and hazardous substances.

Table 2-12 starting on Page 2-89 lists ARARs which I understand were based on ground water standard or surface water drinking standards or other appropriate standards but did not specifically list as potential standards the site specific surface water standards based on aquatic life uses -- I assume because there would be no aquatic life use of "ground water". However, I believe both sets of standards should be listed because

- a) pages 2-87 of the document states there is "significant interaction of alluvial ground water and surface water in the drainages of the Rocky Flats Plant", and*
- b) any discharge to the surface waters, e.g., during remediation, must meet the surface water standards, and these surface water standards could be more stringent than the presently identified ARARs (i.e., aquatic life standards for metals can be significantly more restrictive than drinking water standards).*

Many of the standards for surface water metals are listed as Table Value Standards (TVS) referring to formulas in the Basic Standards which are based on hardness as CaCO_3 .

Page 2-89 The effective site specific surface water standard for chloroform is 1.0 micrograms per liter (based on detectable levels).

The detection level specified by CDH for tetrachloroethene and 1, 1, 2, 2-tetrachloroethane is 1.0 microgram per liter, not 5.

Page 2-93 Typo. It should state: "Analytical results are total nitrate plus nitrite nitrogen."

Page 2-94 The units should be pCi/liter for rads, rather than mg/liter, and the gross alpha ARAR is CDH surface water standard (not ground water).

RESPONSE

There are no chemical specific ARARs for soils and sediments. Acceptable concentrations must be determined through a risk assessment.

Table 2-13 (formerly Table 2-12) has been completely revised in accordance with requirements of the NCP [FR Vol 55, No 46, 8848, 40 CFR 300.430(e)]. Federal Ambient Water Quality Criteria and CDH Surface Water fish and water ingestion standards have been used where most stringent in defining ARARs for the analytes detected at OU 2. Corrections have been made as noted in the other comments [EG&G: We need to address TVSs.]

COMMENT

Table 2-13 Page 2-96

Response actions and remedial technologies should include controls of air emissions for study and review

RESPONSE

Table 2-13 provides an overview of general response actions and applicable technologies and is not intended to provide details of secondary waste generation or air emission controls. The need for and effectiveness of air emission controls will be evaluated for all technologies that generate air pollutant emissions.

COMMENT

Page 3-7 Table 3-2

Are the units in mg/liter or pCi/l for radiological parameters? The table does not address soil or sediments

RESPONSE

Table 3-2 provided redundant information relative to Table 2-13 and therefore has been removed

COMMENT

Section 4.0

The author of this section has provided a well written concise outline of the work ahead

RESPONSE

No response required

COMMENT

Section 4.1.7 Page 4-14

The four methods proposed for treatability study sound interesting and promising

RESPONSE

Please note this section has been modified to address the site-wide Treatability Study Plan as the "driver" for the conduct of treatability studies applicable to contamination at OU 2.

COMMENT

Section 5.0

The Division realizes that the site wide Health and Safety Analysis, Quality Assurance, Prevention of Contaminant Dispersion and Sampling and Analysis documents have not been submitted for review at this time. Inclusion of the relevant parts of these documents is appropriate.

It appears that some of the earlier comments on additional sampling were premature.

RESPONSE

The IAG specifies that the SAP is to include a QAPJP and SOP for all field activities. A draft QAPJP for site-wide RCRA and CERCLA activities was submitted to the regulatory agencies in August 1990. A GRRASP has already been prepared which is the scope of work for analytical services. The current Rocky Flats Plant SOPs were submitted to EPA and CDH in August 1990. A Health and Safety Plan (HSP) defining the protocol for protection of field workers during Phase II operations will be submitted as well. The HSP will be pursuant to the Environmental Restoration Health and Safety Program Plan currently being finalized based on comments from EPA and CDH.

COMMENT

Page 5-30

Don Michels in the 1970's identified that the plutonium contamination had penetrated to at least 8 cm. There is not enough detail presented to concur in the sampling approach. The proposal is not definitive. Pu contamination identified at BH30-87 is at depths greater than 20 feet. Inventory sampling procedures will yield much greater than 2 dpm/gram all the way to Indiana Street. Depth profile (Inventory) soil sampling data needs to be presented in $\mu\text{Ci}/\text{m}^2$ or mCi/km^2 for comparisons with historical information and materials balance (there has been no mass wasting or erosion and removal from these large areas).

RESPONSE

Surficial soil radionuclide contamination at OU 2 will be investigated by collecting 82 surficial soil scrapes (1/8" depth) and 30 vertical soil profile samples (one meter depth). The vertical profile samples will extend below the depth of 8 cm which was identified by Michels as the depth that plutonium contamination had penetrated. Profile soil sampling analytical results will be presented in $\mu\text{Ci}/\text{m}^2$ or mCi/km^2 in the draft Phase II RFI/RI Reports for comparison with historical information.

COMMENT

Figure 5-5

Needs a profile sample due east at Indiana Street due to the windstrewn field in that area.

RESPONSE

A sampling location for an additional profile sample has been added in the area of the intersection of the Rocky Flats Plant east access road with Indiana Street.

COMMENT

Section 5.2.3 Page 5-43

This section needs uranium analysis data included. Regarding the East Trenches data, all BH 53-87 2-3 5 feet deep analyses 0.98 pCi/gram, which is in excess of the State soil standard.

RESPONSE

Uranium 233+234, 235, and 238 do not appear to be contaminants of surficial soils unlike plutonium and americium. Uranium contamination at specific IHSSs will be assessed from borehole soils data where the full suite of radionuclides will be analyzed (Table 5-5). Boreholes to be drilled into IHSSs will extend from the ground surface to the base of weathered bedrock. Continuous samples will be collected for geologic descriptions for the entire borehole depth. From this core, discrete samples will be submitted for laboratory chemical analyses every two feet from the ground surface to the water table. In addition, a discrete sample will be collected for chemical analysis at the water table. Core from saturated surficial materials will not be submitted to the laboratory, as the presence of water in this zone will affect interpretation of chemical results. In order to prevent alluvial ground water from affecting weathered bedrock samples, surface casing will be grouted into the borehole through surficial materials. Subsequent to grout hardening, the borehole will then be advanced through weathered bedrock with continuous sampling. Discrete samples from the core will be submitted to the laboratory for chemical analysis from two feet immediately below the casing and every four feet thereafter to the base of weathering. Section 5.2.3 has been deleted because the information concerning surficial sampling is provided in Section 5.1.3.

COMMENT

Appendix D

The appendix does not include soil or sediment ARARs.

RESPONSE

The appendices provide analytical results only. The discussion of ARARs is presented in Section 2.4.